Boundary Channel Bridge
(Mount Vernon Memorial Highway: Boundary Channel Bridge)
Beside the Navy and Marine War Memorial, carries the Mount Vernon Memorial Highway across the channel which connects the Potomac with the eastern side of Boundary Channel
Washington
District of Columbia

HAER No. DC-19

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
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HISTORIC AMERICAN ENGINEERING RECORD

BOUNDARY CHANNEL BRIDGE
(Mount Vernon Memorial Highway: Boundary Channel Bridge)

HAER No. DC-19

Location: Carries Mount Vernon Memorial Highway across the channel which connects the Potomac River with the eastern side of Boundary Channel. Near the Navy and Marine War Memorial and 0.3 miles north of I-395 along the western shore of the Potomac river (since the western shore of Boundary Channel serves as the Virginia/District of Columbia boundary, this bridge is in the District of Columbia).

UTM: 18/322400/4304740
Quad.: Washington West

Date of Construction: Designed 1929, Completed 1932

Architect: Gilmore D. Clarke

Engineer: C.D. Geisler, Highway Bridge Engineer
J.V. McNary, Senior Engineer,
U.S. Bureau of Public Roads

Contractor: Merritt-Chapman & Scott Corporation, New York, New York

Present Owner: George Washington Memorial Parkway
National Park Service
Department of the Interior

Present Use: Vehicular bridge

Significance: Boundary Channel Bridge is unique among the other bridges erected along the Mount Vernon Memorial Highway. It consists of seven reinforced concrete cantilever girders and two exterior girders of structural steel cantilever trusses encased in concrete. The cantilevered arms extend forty two feet with the free ends supporting a sixteen foot suspended span. This bridge, built in a style to blend into the surrounding landscape, takes on the natural shape of the arch and is faced with native stone. The bridge becomes part of the landscape even more, with the careful attention to the landforms and plantings surrounding the bridge.

Historian: Elizabeth M. Nolin, 1988

The Boundary Channel Bridge on the Mount Vernon Memorial Highway (see HAER No. VA-42) connects Columbia Island with the Virginia shore. It is the first of the parkway bridges one crosses when traveling south from the Arlington Memorial Bridge in Washington, D.C., to Mount Vernon, Virginia.[1] The Boundary Channel bridge looks similar to most of the other bridges designed specifically for the Mount Vernon Memorial Highway. The stone facing on the bridge is a combination of dimensioned masonry and stone masonry. The dimensioned masonry is a light gray granite that is used for the copings, caps, arch ring, and battered abutments. The stone masonry is a granitc and mica schist, its color varying from dark green through blue grey to pink and is used on the abutments and spandrels.[2] The overall length of the bridge is 244 feet with a clear span of 100 feet and a radius of eighty feet, two and one-half inches. The roadway is sixty feet wide, flanked with two six foot sidewalks. The structure consists of seven reinforced concrete cantilever girders and two exterior girders of structural steel cantilever trusses encased in concrete and then faced with stone. The cantilevered arms extend forty two feet, the free ends supporting a sixteen foot suspended span.[3]

Originally the Boundary Channel Bridge was to be similar in style to the Arlington Memorial Bridge (see HAER No. DC-7) and the Boundary Channel extension of the Arlington Memorial Bridge (see HAER No. DC-7B). This bridge was to be a single arch bridge constructed of reinforced concrete. The facing was to be dimensioned granite masonry, light gray in color. In a 1928 report on the Arlington Memorial Bridge, John Nagle wrote:

> It will, of course, be necessary to develop that area of the island...it will also be necessary to connect the island with the mainland by two or more small bridges which will be in architectural agreement with the main bridge....The location of a possible third bridge will be at the lower end of the wider portion of Columbia Island.[4]

In another report written in 1929 the merits of a shoreline versus an inland route for the memorial highway were discussed. The bridge over Boundary Channel was described in this fashion:

As this bridge is only a short distance from, and requires the

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[1] Columbia Island is considered a part of Washington, D.C., therefore the Boundary Channel Bridge is a part of Washington and not Virginia.

[2] U.S. Department of Agriculture, Mount Vernon Memorial Highway Final Report on Unit III Bridges, Bureau of Public Roads, 1932.

[3] ibid, 27.

[4] John L. Nagle, "The Arlington Memorial Bridge," The Military Engineer Volume XX Number 110 (1928): 159.

> same channel opening and provision for park drives that is required at the Arlington Memorial Bridge crossing of the Boundary Channel, it is proposed to use a bridge of the same type and general appearance having the same lengths and arrangement of spans and same general type of railing and other ornamental features including cut granite encasement.[5]

As designed and drawn in 1929 and later revised in 1930 the Boundary Channel Bridge is clearly a typical parkway bridge and has no resemblance whatsoever to the Arlington Memorial Bridge.[6] Research, to date, has not turned up any pertinent information regarding the design change from an all gray granite faced bridge with a bush hammered finish to a granite and mica schist faced bridge with a rock face finish.

Prior to construction of the bridge, improvements were made on Columbia Island. Dredging and filling took place, in order to raise the height of the island to match that of the Lincoln Memorial.[7] Riprap sea walls were built along the Virginia shore and backfilled to shorten the distance of the water crossing for the Boundary Channel Bridge.[8]

Originally cofferdams were to be used for construction of the footings and pile driving. Due to the unstable soil in the riverbed, the excavation took place in the open and was then backfilled with sand and gravel.[9] This work took place between November 14, 1930, and January 21, 1931. Pile driving operations began on January 3, 1931. Two lengths of piles were used: sixty feet long for the abutments[10] and seventy-five feet long piles for the wing walls.[11] At this point the lateral stability of this structure was questioned due to the length of the piles which were driven in such unstable material. Several solutions to the problem were suggested but due to the added expense

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[5] U.S. Department of Agriculture, Report on Alternate Routes for the Proposed Memorial Highway, Washington, D.C., to Mount Vernon, Virginia. Bureau of Public Roads, (January 1929): 22.

[6] U.S. Department of Agriculture, Specifications for Bridges. Bureau of Public Roads, 1930.

[7] Nagle, 159.

[8] U.S. Department of Agriculture, Mount Vernon Memorial Highway Report on Pavements Unit IV Sections 1 and 2, 1931. Bureau of Public Roads, 1931.

[9] U.S. Department of Agriculture, Mount Vernon Memorial Highway Final Construction Report on Unit III Bridges. Bureau of Public Roads, 1932.

[10] ibid, 30.

[11] ibid, 31.

none were adopted.[12] The cause for concern would come up once more when bids were opened to contractors regarding the placement of structural steel struts near each end of and between the footings of the north and south concrete piers of the Boundary Channel Bridge. The struts were put into place by Diamond Construction Company of Washington, D.C., and measured forty-four inches by forty-nine inches by ninety-three feet long. This construction was completed on August 9, 1945.[13]

Concrete work including the seals, footings and wingwalls for the north and south abutments began on February 13, 1931 and was concluded on March 30, 1931.[14] The laying up of the masonry was carried on simultaneously with the pouring of the concrete. The stone for the breast walls for each of the abutments was taken from the old abutment of the 14th Street bridge. The ashlar stone was split and used in courses eighteen inches deep.[15] The north abutment was completed up to the spring line on April 6, and on April 9, structural steel shoes for the cantilever arms were grouted into place. The construction to the spring line on the south abutment followed on April 24, and the steel shoes were set on April 28.[16] The center and first of seven concrete anchor arms for the north abutment was poured on May, 19. Each of the successive arms were poured in pairs, one on each side of the center, following the construction techniques of the first.[17] On June 3, the erection of the structural steel for the exterior cantilever arms was begun on the north abutment and on June 17, for the south abutment. The cantilever arms were attached to the wing walls with eyebars.[18] Falsework was used in the pouring of the concrete for the anchor arms and the cantilever arms for the bridge.[19] Placement of the roadway fill was started on June 29, and by July 17, sections of the roadway floor was ready to be poured.[20]

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[12] ibid, 33.

[13] U.S. Department of Transportation, George Washington Memorial Parkway Project 5B6 Final Construction Report Installation of Struts Between Piers of the Bridge over Boundary Channel on the Mount Vernon Memorial Highway. Federal Highway Department, 1945.

[14] Final Construction Report Unit III Bridges, 38.

[15] ibid, 37.

[16] ibid, 39.

[17] ibid, 40.

[18] ibid, 41.

[19] ibid, 42.

[20] ibid, 44

When the falsework was removed from the interior cantilever arms, the suspended span of short steel trusses that coordinated with the outside girders were set in place.[21] The suspended span was poured on August 19.[22] The construction of the exterior girders was done without falsework. Forms attached with removable bolts were hung from the steel trusses. The stone for the arch ring was cut with a shoulder. The stone was attached with mortar to a flange on the steel truss.[23] In addition, the stone was also wired to the structural steel with steel anchors.[24] Between August 20 and September 4, the belt courses of six inch and nine inch stone were set in place and the masonry cleaned with a solution of diluted muratic acid and pointed.[25] The stone work on the bridge was completed on September 24. Final construction work such as damp-proofing, removal of form work and installation of six navigation lights was completed on October 17, with final acceptance of the bridge given on November 19.

The total cost for the construction of the Boundary Channel Bridge was $439,261.82.[26] The architect for the bridge was Gilmore D. Clarke, a landscape architect and a member of the Westchester County Park Commission.[27] Engineers in charge of the construction of the bridge were C.D. Geisler, Highway Bridge Engineer and J.V. McNary, Senior Engineer. These men worked under the auspices of the Bureau of Public Roads, then a division of the U.S. Department of Agriculture.

This bridge, as with the other bridges on the Mount Vernon Memorial Highway, was designed to be submissive to the landscape. Careful attention was given to the shape of the bridge, the native stone used for facing the bridge, and the landscape surrounding the bridge. This was all in keeping with the overall design of the parkway which was primarily a landscaping project of monumental proportions. As seen in before and after photographs of the Bronx River Parkway, man can have not only a negative impact on the land but also a positive one. The influence of the men of Westchester County Park Commission on the Mount Vernon Memorial Highway was a great one. The Virginia shoreline that was destroyed by man was rendered beautiful and natural once

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[21] ibid, 45.

[22] ibid, 47.

[23] ibid, 45.

[24] ibid, 46.

[25] ibid, 48.

[26] ibid, 50.

[27] The Westchester County Park Commission was comprised of some of the men who were part of the group that designed the Nations first parkway, the Bronx River Parkway.

more by the groups working to build the Memorial Highway and its bridges.

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ADDENDUM TO
BRIDGE OVER BOUNDARY CHANNEL
(Humpback Bridge)
George Washington Memorial Parkway, spanning Boundary Channel
Washington
District of Columbia

HAER NO. DC-19

PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
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